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THE Be-Rh (BERYLLIUM-RHODIUM) SYSTEM

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The Be-Rh (Beryllium-Rhodium) System
9.01218 102.9055

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Equilibrium Diagram

Three intermediate phases, (1) $\text{Be}_{13.2}\text{Rh}$ (13.2 at.% Rh) [70Joh] or $\text{Be}_{17}\text{Rh}_{12}$ (10.5 at.% Rh) [71Ver], (2) Be_2Rh [36Mis], and (3) BeRh [68Krul], have been found in this system. No other phase diagram data are available.

The melting point of βBe and the $\beta\text{Be} \rightarrow \alpha\text{Be}$ allotropic transformation temperature are 1289 ± 4 and 1270 ± 6 °C, respectively [86BAP]. [50Kau] observed a eutectic network in a slowly cooled alloy containing 1 at.% Rh. Hence, the solubility of Rh in (αBe) is probably much less than 1 at.%. The melting point of Rh is 1963 °C [81BAP].

Crystal Structures

A summary of crystal structure and lattice parameter data is given in Table 1. $\text{Be}_{13.2}\text{Rh}$ [70Joh] and $\text{Be}_{17}\text{Rh}_{12}$ [71Ver] were reported to have nearly identical lattice size but differing hexagonal forms; both are derivative of the CaCu_5 prototype. The non-integer formula, $\text{Be}_{13.2}\text{Rh}$, is due to a partial occupancy of lattice sites [70Joh]. The results of studies on single crystals [70Joh] are preferred in Table 1 to those from studies on powder specimens [71Ver].

The CsCl-type structure of BeRh reported by [68Krul] was consistently explained by [80Tan] from the study of a series of Be-transition metal systems.

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Table 1 Be-Rh Crystal Structure and Lattice Parameter Data

Phase	Composition, at.% Rh	Struktur- Pearson bericht		Space group	Proto- type	Lattice parameters, nm		Reference
		symbol	designation			a	c	
(β Be)....	0	cI2	A2	Im3m	W	0.25515	...	[82Kin]
(α Be)....	0	hP2	A3	P6 ₃ /mmc	Mg	0.22857	0.35839	[81Kin]
Be ₁₀ Rh...	13.2	(hexagonal)	(a)	P6 ₃ m2	...	0.4191	1.0886	[70Joh]
Be ₁₇ Rh ₂ ...	10.5	(hexagonal)	(b)	P6/mmm	...	0.4203	1.090	[71Ver]
Be ₂ Rh....	33.3	(c)	?	?	?	?	?	[36Mis]
BeRh.....	50	cP2	B2	Pm3m	CsCl	0.27397	...	[68Kru]
(Rh).....	100	cF4	A1	Fm3m	Cu	0.38032	...	[81Kin]

(a) Closely related to the CaCu₅ (D2₃) type [70Joh].

(b) Th₂Zn₁₇ or Ni₁₇Th₂ type. (c) Complex. Similar to Be₂Ir [36Mis]. Anisotropic [68Kru].

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* Indicates key paper.